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भाग 4 धूम एवं गैस उत्सर्जन

Indian Standard

WELDING — TEST FOR SHOP PRIMERS IN RELATION TO WELDING AND ALLIED PROCESSES

PART 4 EMISSION OF FUMES AND GASES

ICS 25.160.10

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BUREAU OF INDIAN STANDARDS
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NEW DELHI 110002

December 2012 **Price Group 2**

Welding Application Sectional Committee, MTD 12

NATIONAL FOREWORD

This Indian Standard (Part 4) which is identical with ISO 17652-4 : 2003 ‘Welding — Test for shop primers in relation to welding and allied processes — Part 4: Emission of fumes and gases’ issued by the International Organization for Standardization (ISO) was adopted by the Bureau of Indian Standards on the recommendation of the Welding Application Sectional Committee and approval of the Metallurgical Engineering Division Council.

This standard is published in four parts. Other parts in this series are:

Part 1 General requirements
Part 2 Welding properties of shop primers
Part 3 Thermal cutting

The text of ISO Standard has been approved as suitable for publication as an Indian Standard without deviations. Certain conventions are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following:

a) Whenever the words ‘International Standard’ appear referring to this standard, they should be read as ‘Indian Standard’.
b) Comma (,) has been used as a decimal marker while in Indian Standards, the current practice is to use a point (.) as the decimal marker.

In this adopted standard, reference appears to certain International Standards for which Indian Standards also exist. The corresponding Indian Standards which are to be substituted in their respective places, are listed below along with their degree of equivalence for the editions indicated:

International Standard	*Corresponding Indian Standard*	*Degree of Equivalence*
EN ISO 2808 : 2007 Paints and varnishes — Determination of film thickness	IS 101 (Part 3/Sec 2) : 1989 Methods of sampling and test for paints, varnishes and related products: Part 3 Tests on paint film formation, Section 2 Film thickness (*third revision*)	Technically Equivalent
EN ISO 17652-1 : 2003 Welding — Test for shop primers in relation to welding and allied processes — Part 1 General requirements	IS 16002 (Part 1) : 2012 Welding — Test for shop primers in relation to welding and allied processes: Part 1 General requirements	Identical

The technical committee has reviewed the provisions of the following International Standards referred in this adopted standard and has decided that they are acceptable for use in conjunction with this standard:

International Standard	*Title*
EN 439 : 1994	Welding consumables — Shielding gases for arc welding and cutting
EN 440 : 1995	Welding consumables — Wire electrodes and deposits for gas shielded metal arc welding of non alloy and fine grain steels — Classification
EN 10025 : 1990	Hot rolled products of non-alloy structural steels — Technical delivery conditions
EN 10238 : 2009	Automatically blast-cleaned and automatically prefabricated primed structural steel products

(*Continued on third cover*)

IS 16002 (Part 4) : 2012
ISO 17652-4 : 2003

Indian Standard

WELDING — TEST FOR SHOP PRIMERS IN RELATION TO WELDING AND ALLIED PROCESSES

PART 4 EMISSION OF FUMES AND GASES

1 Scope

This part of this standard specifies rating of shop primers as regards their influence on emission of fumes and gases during welding.

For precaution for protection of health, safety and environment during testing, see EN ISO 17652-1.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 439, *Welding consumables - Shielding gases for arc welding and cutting.*

EN 440, *Welding consumables - Wire electrodes and deposits for gas shielded metal arc welding of non alloy and fine grain steels - Classification.*

EN ISO 2808, *Paints and varnishes - Determination of film thickness (ISO 2808:1999).*

EN ISO 4063, *Welding and allied processes — Nomenclature of processes and reference numbers (ISO 4063:1998).*

EN ISO 6947, *Welds — Working positions — Definitions of angles of slope and rotation (ISO 6947:1993).*

EN 10025:1990, *Hot rolled products of non-alloy structural steels — Technical delivery conditions.*

EN 10238, *Automatically blast-cleaned and automatically prefabricated primed structural steel products.*

EN ISO 15011-1, *Health and safety in welding and allied processes - Laboratory method for sampling fume and gases generated by arc welding - Part 1: Determination of emission rate and sampling for analysis of particulate fume (ISO 15011-1:2002).*

prEN ISO 15011-2, *Health and safety in welding and allied processes - Laboratory method for sampling fume and gases generated by arc welding - Part 2: Determination of emission rates of gases, except ozone (ISO/FDIS 15011-2:2002).*

EN ISO 17652-1:2003, *Welding - Test for shop primers in relation to welding and allied processes - Part 1: General requirements (ISO 17652-1:2003).*

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions in EN ISO 17652-1:2003 apply.

4 Emission test

4.1 Preparation of test piece

2 × 3 test pieces with shop primers shall be prepared for each shop primer. Further, 2 × 3 abrasive blasted test pieces shall be used as a reference.

Each test piece shall consist of one mild steel plate conforming to S275 of EN 10025. The dimensions of the test pieces shall be as follows:

10 mm × 100 mm× 500 mm

The test pieces shall be abrasively blasted until Sa 2½ (ISO 8501-1:1988) in order to remove the mill scale. The components shall have smooth, flat, undamaged surfaces and any burrs shall be removed to ensure a good fit-up.

The six test pieces with shop primer shall be coated on the top side with shop primer prior to testing. The thickness of the shop primer shall be in accordance with the manufacturer's recommendation.

When no agreed procedure is specified EN 10238 shall apply. The thickness of the shop primer shall be uniform and in accordance with the supplier's recommendation. Unless otherwise specified, the specimens can be welded after a drying period of at least 10 days at a surface temperature above 10°C but below 40°C and at a minimum air humidity of 50 %.

The thickness shall be checked, e.g., by use of small smooth steel plates or glass plates. See also EN ISO 2808 and EN 10238.

4.2 Procedure

4.2.1 Welding

The influence of the shop primer on the fume and gas emission associated with welding shall be measured using the fume box technique in accordance to EN ISO 15011-1 and prEN ISO 15011-2.

The test piece is mounted in the fume box, flat so that welding can proceed in the welding position PA in accordance with EN ISO 6947. Declaration of the properties on a shop primer according to this standard shall be based on metal active gas welding (process 135 according to EN ISO 4063) using the following weld data, see Table 1. Three pieces shall be welded for each process.

Table 1 - Rating test welding parameters

Welding process	135, see EN ISO 4063	135, see EN ISO 4063
Current	250 A ± 5 %	250 A ± 5 %
Voltage	30 V ± 5 %	28 V ± 5 %
Welding speed	300 mm/min ± 5 %	300 mm/min ± 5 %
Shielding gas	C1: 100 % CO_2 , see EN 439	M21: 82 % Ar, 18 % CO_2 see EN 439
Gas flow rate	15 l/min ± 5 %	15 l/min ± 5 %
Gas cup diameter	16 mm to 19 mm	16 mm to 19 mm
Stick out	18 mm to 20 mm	18 mm to 20 mm
Consumable, classification	G3 Si 1, see EN 440	G3 Si 1, see EN 440
Consumable, diameter	1,2 mm	1,2 mm
Polarity	+ on electrode	+ on electrode

The test pieces shall have room temperature prior to welding.

In addition, the wire feeding speed shall be recorded for each test.

4.2.2 Testing

The fume and gas emission rates are determined for each test as specified in prEN ISO 15011-1 and prEN ISO 15011-2 and the sampled fumes and gases are analysed in order to determine the significant chemical components.

NOTE The fume should be analysed for at least the following elements: Fe, Mn, Zn, Cu, Pb, Cr(T), F. The gases should be analysed for at least NO, NO_2 and CO, as appropriate. Other possible gaseous decomposition products like xylene, ethanol, butanol, methanol, isopropylalcohol, formaldehyde, phenol should be analysed if they are supposed to be emitted in relevant quantity that might harm human health and the environment.

Average emission rates are determined from each series of three test pieces. For each component is determined:

— average emission rate, test pieces with shop primer;

— average emission rate, test pieces without shop primer;

— change in emission rate = (average emission rate, test pieces with shop primer) minus (average emission rate, test pieces without shop primer).

Emissions of fumes and gases to be reported as specified in prEN ISO 15011-2.

5 Assessment of result

The analysis shall provide sufficient information to enable documentation of conformity to national health and safety regulations and other relevant requirements. A fume data sheet may have to be prepared.

6 Test report

The report shall contain the following information:

a) trade mark of the shop primer;

b) type of shop primer;

c) observed dry film thickness;

d) description of welding equipment used in the tests;

e) specification of the test pieces (materials certificates);

f) process used for welding;

g) observed changes in emission rate for all relevant chemical components;

h) a combined measure of the additional environmental loads due to application of a shop primer may also be calculated on the basis of the observed changes in emission rates. However, such calculations depend on national legal requirements or other requirements and unequivocal reference to the applied requirements have to be included in any reporting of a combined measure of the additional environmental loads;

I) date, name and address of the test body;

j) signature by the responsible person.

Annex ZA
(informative)

Corresponding International and European Standards for which equivalents are not given in the text

At the time of publication of this standard, the editions of the following documents were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the documents indicated below. Members of ISO and IEC maintain registers of currently valid International Standards.

EN 10025 ISO 630 – *Structural steels – Plates, wide flats, bars, sections and profiles.*

(*Continued from second cover*)

International Standard	*Title*
EN ISO 4063 : 1998	Welding and allied processes — Nomenclature of processes and reference numbers
EN ISO 6947 : 2011	Welds — Working positions — Definitions of angles of slope and rotation
EN ISO 15011-1 : 2002	Health and safety in welding and allied processes — Laboratory method for sampling fume and gases generated by arc welding — Part 1: Determination of emission rate and sampling for analysis of particulate fume
prEN ISO 15011-2 : 2009	Health and safety in welding and allied processes — Laboratory method for sampling fume and gases generated by arc welding — Part 2: Determination of emission rates of gases, except ozone

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of ‘BIS Catalogue’ and ‘Standards: Monthly Additions’.

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Amendments Issued Since Publication

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